

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appl. No.: 10/674,908 Confirmation No.: 9006
Applicant(s): Crooks et al.
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Art Unit: 1731
Examiner: Lazorcik, Jason L.
Title: FILTERED CIGARETTE INCORPORATING AN ADSORBENT
MATERIAL

Docket No.: 030627/267420
Customer No.: 00826

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Commissioner for Patents
P.O. Box 1450
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REVISED APPEAL BRIEF UNDER 37 CFR § 41.37

This Appeal Brief is filed pursuant to the “Notice of Appeal to the Board of Patent Appeals and Interferences” filed January 4, 2007, as further revised in response to the Notification of Non-Compliant Appeal Brief mailed on May 25, 2007.

1. ***Real Party in Interest.***

The real party in interest in this appeal is R.J. Reynolds Tobacco Company, the assignee of the above-referenced patent application.

2. ***Related Appeals and Interferences.***

There are no related appeals and/or interferences involving this application or its subject matter.

3. ***Status of Claims.***

Claims 1 and 3-20 are pending and all claims stand rejected as unpatentable over a combination of prior art references as set forth in greater detail below. All rejections of record are appealed herein.

4. ***Status of Amendments.***

All claim amendments presented during prosecution were entered and are set forth in the clean copy of the pending claims appended to the brief. Claims 1 and 20 were amended once during prosecution and claim 2 has been canceled.

5. ***Summary of Claimed Subject Matter.***

The present invention is directed to a cigarette comprising a tobacco rod and a filter element having a particular configuration. Specifically, the filter element comprises a first section of fibrous tow positioned proximal to the tobacco rod and a second section of fibrous tow positioned at the mouth-end of the filter element, the two fibrous tow sections defining a compartment therebetween. A semi-permeable barrier serves to divide the compartment into two regions. The region adjacent to the tobacco-end fibrous tow section is hollow and the region proximal to the mouth-end fibrous tow section contains an adsorbent material. As set forth in Example 4, Applicants have surprisingly discovered that the presently-claimed filter element configuration provides greater reduction of certain gas phase components in mainstream smoke generated by the cigarette as compared to a conventional "plug/space/plug" filter arrangement that does not include a hollow compartment upstream of the adsorbent material.

Independent claim 1 recites a cigarette comprising a tobacco rod and a filter element. Tobacco rods and materials useful for construction of tobacco rods are described on pages 8-15 of the specification. In particular, types of smokable materials that can be employed in a tobacco rod are described on pages 10-12. Filter elements and components thereof are described on pages 15-26.

As also set forth in independent claim 1, the present invention is directed to a cigarette comprising a tobacco rod and a filter element connected to the tobacco rod, the filter element having an end proximal to the tobacco rod and an end distal from the tobacco rod (See Figs. 1 and 3 and page 7, lines 1-25). The filter element comprises two sections of fibrous tow material, a first longitudinally extending section and a second longitudinally extending section, defining a compartment therebetween (See Fig. 3; page 15, lines 16-25; page 24, lines 25-31). Such a filter arrangement is also discussed on pages 15-18 and in the accompanying figures, such as Figure 3. Additionally, independent claim 1 recites the presence of a semi-permeable barrier within the compartment, as well as a hollow region and a region containing an adsorbent material (See Fig. 3; page 18, lines 14-22; page 25, line 25 – page 26, line 6). It is again noted that this configuration is shown in Figure 3 and discussed in the accompanying text on page 18. Specific adsorbent materials are described on pages 15-17. Materials for use as the semi-permeable barrier are described on pages 25 and 26.

Independent claim 20 is similar in scope to claim 1, and for the common claim limitations, please refer to the same sections of the specification noted above. In particular, please refer to the same sections of the specification noted above for teachings relevant to the two sections of filter material, the compartment therebetween, the semi-permeable membrane, the adsorbent, and the hollow region. Claim 20 also specifically recites that the semi-permeable membrane comprises paper or fibrous filter material, and further notes that the adsorbent material is granular in form (See page 24, lines 25-31 and page 16, lines 10-18).

6. ***Grounds of Rejection to be Reviewed on Appeal.***

Claims 1, 3-15, and 17-20 stand rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent No. 5,629,525 to Counts in view of U.S. Patent No. 6,814,786 to Zhuang and U.S. Publication No. 2004/0226569 to Yang, and further in view of the Keith et al. reference (“Tobacco Smoke Filtration”; 1970 (est.)).

Claim 16 stands rejected under 35 U.S.C. 103(a) as being unpatentable over the above-noted references, further in view of the Degel 1990 reference (“Purification of Air, Water, and Off-gas Solvent Recovery”).

7. *Argument.*

I. Rejection of Claims 1, 3-15, and 17-20 under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,629,525 to Counts in view of U.S. Patent No. 6,814,786 to Zhuang and U.S. Publication No. 2004/0226569 to Yang, and further in view of the Keith et al. reference

In this rejection, the Examiner relies upon the modification of a filter described in the Counts reference in view of the Zhuang and Yang references. The Examiner also relies on the Keith reference as motivating a further modification of a sub-element of the Zhuang filter component.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim elements. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art and not based on applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

A. Lack of Motivation to Combine Counts, Zhuang, and Yang to form Claimed Filter Configuration

Applicants first note that the piecemeal selection and arrangement of various filter elements from the Counts, Zhuang, and Yang references required to form the present rejection is highly suggestive that the Examiner is improperly relying on Applicants' disclosure as a guide in reviewing the teachings of the prior art. While it is true that the Zhuang and Yang references briefly refer back to the Counts filter structure, there is nothing suggesting the specific arrangement of elements relied upon by the Examiner to arrive at the presently-claimed invention. For example, there is nothing in any of the cited references to lead one of ordinary

skill in the art to place the Zhuang filter element 30 at one end of the tubular free-flow filter 72 of the Counts filter with the carbon particles of Yang between the Zhuang filter component and the terminal filter segment 104 of the Counts filter. Only Applicants' claimed invention could lead the Examiner to arrange these components in this manner. Given the lack of specific teaching in any of the cited references as to specific arrangements of the components taught therein, one of ordinary skill in the art would be just as inclined, if not more so, to place the Zhuang filter component in the middle of the tubular free flow filter section of the Counts filter with the Yang carbon particles on each side. Alternatively, one could arrange the Yang particles in the interior space within the Zhuang filter component. In yet another embodiment, one could place the Zhuang filter component adjacent to the terminal filter element 104 of the Counts filter and place the Yang carbon particles on the tobacco-side of the Zhuang filter component. Other component arrangements could also be envisioned, none of which impact the present claims.

Again, this fact strongly suggests that impermissible hindsight is being utilized to cobble together disparate elements of multiple references in order to arrive at the present claims. The law requires the teachings of the prior art to be considered without reference to Applicants' disclosure. It is respectfully submitted that one of ordinary skill in the art would not arrive at the presently-claimed invention based on the references cited by the Examiner because there are no specific teachings as to how the various filter components should be arranged in an advantageous manner. For example, there is no suggestion as to the specific arrangement of the Zhuang filter component within the tubular free flow element of Counts, and certainly nothing to suggest how one should arrange the Zhuang filter component in relation to activated carbon particles from the Yang reference. Numerous permutations could be envisioned, most of which have no relationship to the present claims.

In response to the above argument, the Examiner merely dismissed the various filter component combinations noted above as "obvious variants" and opined that only a showing of "materially unexpected results" attributable to the claimed configuration could distinguish it from the other possible combinations. Without further comment, the Examiner stated that no unexpected results have been shown, without even mentioning the surprising results noted by

Applicants in the last office action response and set forth in Example 4 of the application. These surprising results are discussed in greater detail hereinbelow.

Evidence of surprising results aside, Applicants respectfully submit that the Office has failed to meet its burden of showing that all of the various configurations that could result from combining Counts, Zhuang, and Yang are “obvious variants.” Zhuang and Yang provide absolutely no guidance or suggestion as to how the filter elements described therein could be incorporated into the Counts filter relative to one another, meaning there is nothing in any reference of record that provides guidance as to how the Yang particles should be placed relative to the filter element 30 of Zhuang. It is Applicants’ contention that the Examiner has impermissibly relied upon the specification of the pending application to compensate for this glaring deficiency in the teachings of the art.

Zhuang basically notes that the filter component 30 described therein can be inserted into any component of the Counts filter. Specifically, Zhuang states at column 14, lines 15-21:

“The filter 30 can be incorporated at one or more locations of the filter portion 62 of the non-traditional cigarette 100. For example, the filter 30 can be substituted as part of, or in place of, the tubular free-flow filter element 102 and/or the free-flow filter element 74, and/or placed in the void space 91. Further, the filter portion 62 can be modified to create one or more void spaces into which filter 30 can be located.”

Thus, Zhuang does not motivate one of ordinary skill in the art to place the filter component 30 at any particular location and, instead, references every single sub-component of the Counts filter as a possible location. No preference as to location of filter component 30 is provided. Thus, one of ordinary skill in the art is left with nothing more than a broad suggestion that component 30 can be somehow incorporated into the Counts filter.

The Yang reference is similarly expansive when it comes to relating the Yang adsorbent particles to the Counts filter. Paragraphs 58-60 of Yang contain the relevant text and are reproduced below:

“[0058] In such a cigarette, the flavored carbon particles can be incorporated in various ways such as by being loaded onto paper or other substrate material which is fitted into the passageway of the tubular free-flow filter element 102 therein. The flavored carbon particles may also be deployed as a liner or a plug in the interior of the tubular free-flow filter element 102. Alternatively, the flavored carbon particles can be incorporated into the fibrous wall portions of the tubular free-flow filter element 102 itself. For instance, the tubular free-flow filter element or sleeve 102 can be made of suitable materials such as polypropylene or cellulose acetate fibers and the flavored carbon particles can be mixed with such fibers prior to or as part of the sleeve forming process.

[0059] In another embodiment, the flavored carbon particles can be incorporated into the mouthpiece filter plug 104 instead of in the element 102. However, as in the previously described embodiments, according to the invention, flavored carbon particles may be incorporated into more than one component of a filter portion such as by being incorporated into the mouthpiece filter plug 104 and into the tubular free-flow filter element 102.

[0060] The filter portion 62 of FIG. 10 can also be modified to create a void space into which the flavored carbon particles can be inserted.”

Thus, the Yang reference suggests the following location for the carbon particles in the Counts filter: (1) loaded onto paper in the passageway of the tubular element 102; (2) deployed as liner or plug in tubular element 102; (3) in the wall of tubular element 102; (4) in mouthpiece plug 104; and (5) otherwise incorporated into a void in the filter element.

In order for the combination of Counts, Yang, and Zhuang to have any relevance to the present claims, the Zhuang filter component 32 must be located upstream of the Yang adsorbent particles because the Examiner is relying on the interior space of the filter element 30 as equivalent to the claimed hollow region. As can be seen, such a very specific arrangement is simply not suggested by any reference of record, and is only one of many conceivable arrangements.

Between them, the Yang and Zhuang references suggest virtually every conceivable location within the Counts filter element as a possible spot for the filter element 30 of Zhuang

and the carbon particles of Yang. Therefore, combining the express teachings of these references leads one to a large number of filter component combinations without anything to motivate the selection of one over another. The Examiner concludes without evidence that this means that all configurations are “obvious variants,” but Applicants respectfully submit that this glosses over the question of obviousness and does not adequately address the requirement of suggestion or motivation in the art to combine the references in the manner required for the rejection.

The Examiner points to two cases, *In re Japikse* and *In re Kuhle*, that allegedly support the obviousness rejection because these cases held that position or placement of a component of a device can be considered obvious if placement does not affect operation or performance. However, even assuming those cases are relevant to the present rejection, it is again noted that the Examiner has ignored evidence in the specification that clearly illustrates a performance effect associated with the relative position of a hollow compartment and an adsorbent-containing compartment. As explained in greater detail below, Example 4 clearly shows that placement of a hollow compartment upstream of the adsorbent can lead to reduction in certain gas phase components of mainstream smoke. Thus, Applicants have presented evidence of a performance-related effect attributable to the relative position of a hollow compartment and an adsorbent in a filter element. Even following the cases relied upon by the Examiner, such evidence should refute the obviousness rejection based on a combination of Counts, Zhuang, and Yang. Accordingly, in light of the foregoing, Applicants respectfully request reversal of this obviousness rejection.

B. Lack of Motivation to Combine Keith Reference with Zhuang Reference

Additionally, Applicants submit that the Examiner has not sufficiently explained how one of ordinary skill in the art would be motivated to further modify the Zhuang filter component by replacing elements 32 with a common fibrous tow. In response to this argument, the Examiner merely comments that fibrous tow is a common filtration material and, thus, would have been an obvious modification of the materials taught by Zhuang for use as the filter component 32.

However, Applicants direct attention to the background section of the Zhuang reference, which specifically mentions prior art cigarette filters incorporating cellulose or other synthetic

fibers. The Zhuang patent specifically notes that such filter arrangements generally only remove particulate matter and condensable components from tobacco smoke and “thus are not optimal for the removal of gas-phase constituents from tobacco smoke” (column 1, lines 13-19). The Zhuang reference is intended to provide an improved filter structure comprising a filter element suitable for gas filtration, and expressly mentions that common fibrous materials are not advantageous for this purpose (column 1, lines 46-47 and 51-56). Thus, it is clear from the Zhuang patent that common fibrous tow filter materials are deficient in terms of selective removal of certain gas-phase constituents from cigarette smoke, and would be unsuitable for the purpose of the filter component 32 of Zhuang, which is expressly described as an improvement over existing filter materials and specifically designed for gas filtration. Since the specific goal of the Zhuang reference is to provide a filter element that selectively removes gas-phase constituents, it follows that one of ordinary skill in the art with knowledge of the entire teachings of the cited references would not be motivated to replace either of the elements 32 of the Zhuang filter component with common fibrous tow material.

This conclusion is further confirmed by the description of the preferred types of sorbent materials noted in Zhuang, such as activated carbon, zeolites, silicates, alumina phosphates, mixed oxide gels, and the like (column 6, lines 2-30). Such components are known to be filtering materials selective for certain gas-phase components of mainstream cigarette smoke, and are even discussed in the present application as materials that adsorb one or more gas-phase compounds from mainstream smoke (see pages 15-16 of the specification). These types of materials are quite dissimilar from common fibrous tow used in conventional cigarette manufacture. Applicants further note that the filter arrangements described in Zhuang include other filter segments that can comprise fibrous tow material, such as mouthpiece filter plug 8 or plug 16 (column 13, lines 19-24). The fact that the Zhuang reference specifically discusses conventional fibrous filter elements that can be incorporated into the filter design, and yet does not remotely suggest that such materials would be suitable as the monolithic sorbent segments 32, is strongly suggestive that one of ordinary skill in the art would not view the combined art cited by the Examiner as motivating one to replace the activated carbon or zeolite materials of the sorbent sections 32 with common fibrous tow. There is also nothing in the Keith reference to

suggest that the materials suggested in the Zhuang patent for sorbent sections 32 are interchangeable with fibrous tow materials. In fact, the data presented in the Keith reference clearly suggests that charcoal and similar materials have quite different filtration characteristics than fibrous tow.

Therefore, it is respectfully submitted that there is no motivation to modify the Zhuang filter component 32 by replacing the monolithic sorbent segments with fibrous tow because to do so would be counter to the express purpose of the filter component 32, which is to provide selective gas-phase adsorption. One of ordinary skill in the art would not be motivated to make a modification that would negate the purpose and intended function of the filter component 32 (i.e., selective gas-phase adsorption), particularly where the Zhuang reference expressly teaches that the proposed modification would negate the desired function. Accordingly, for this additional reason, Applicants respectfully request reversal of this obviousness rejection.

C. Evidence of Surprising Results Overcomes Obviousness Rejections

Finally, Applicants note that the present specification includes evidence of surprising results associated with the filter configuration as presently claimed. Thus, even if the Examiner has presented a *prima facie* obviousness rejection, which Applicants obviously do not admit as noted above, the claimed invention is still patentable over the cited art.

Attention is directed to Example 4, wherein testing of cigarettes having the presently-claimed configuration is described. As noted therein, the exemplary cigarettes having a divided compartment containing an adsorbent in the downstream compartment and a hollow upstream compartment provided greater reduction of certain vapor-phase mainstream smoke components as compared to a cigarette of Example 1, which comprises a conventional “plug/space/plug” arrangement. The conventional cigarette arrangement does not include a divided compartment with a hollow section upstream of the adsorbent material. Instead, the adsorbent compartment is adjacent to the tobacco-end fibrous tow section.

The division of the interior compartment into a hollow upstream section and an adsorbent-fill downstream section results in greater reduction of certain gas phase components. This result is surprising and certainly not anticipated or suggested by any of the art relied upon

by the Examiner. There is nothing in the art that suggests inclusion of a hollow region upstream of an adsorbent-containing compartment will enhance filtration performance. For this additional reason, Applicants respectfully submit that any obviousness rejection presented against the pending claims should be overcome. Accordingly, for this additional reason, Applicants respectfully request reversal of this rejection.

II. Rejection of Claim 16 under 35 U.S.C. 103(a) as unpatentable over U.S. Patent No. 5,629,525 to Counts in view of U.S. Patent No. 6,814,786 to Zhuang and U.S. Publication No. 2004/0226569 to Yang, and further in view of the Keith et al. reference and the Degel 1990 reference

Claim 16 depends from claim 1, and Applicants respectfully submit that the same arguments against the rejection of claim 1 presented in Section 7.I. above apply with equal force to the rejection of claim 16. Specifically, Applicants submit that there is no motivation to combine Counts, Zhuang, and Yang to form the claimed filter configuration as argued above. There is also no motivation to combine the Keith reference with the Zhuang reference. Finally, the evidence of surprising results noted above weighs heavily against any obviousness rejection of the pending claims, including claim 16. Accordingly, for the same reasons set forth above, Applicants respectfully request reversal of this rejection.

8. ***Claims Appendix.***

An appendix containing a copy of the claims involved in the appeal is attached.

9. ***Evidence Appendix.***

No additional evidence of patentability has been submitted to the Examiner.

10. ***Related Proceedings Appendix.***

There are no decisions by a court or the Board in related proceedings.

CONCLUSION

In view of the foregoing arguments, Appellant respectfully submits that Claims 1 and 3-20 are patentable over the cited references. A decision from the Board of Patent Appeals and Interferences reversing the final rejection of the pending claims is therefore earnestly solicited.

Respectfully submitted,

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CLAIMS APPENDIX

1. (Previously Presented) A cigarette comprising a tobacco rod and a filter element connected to the tobacco rod, said filter element having an end proximal to the tobacco rod and an end distal from the tobacco rod, wherein said filter element comprises:
 - a first longitudinally extending section of fibrous tow filter material positioned at the end of the filter element proximal to the tobacco rod;
 - a second longitudinally extending section of fibrous tow filter material positioned at the end of the filter element distal from the tobacco rod and spaced apart from said first section of filter material, the two sections of filter material defining a compartment therebetween by enclosing each end of said compartment;
 - a semi-permeable barrier dividing said compartment into a first region adjacent to said first section of filter material and a second region adjacent to said second section of filter material; and
 - an adsorbent material contained within said second region of said compartment, wherein said first region of said compartment is hollow.
2. (Canceled)
3. (Original) The cigarette of Claim 1, wherein said first section of filter material and said second section of filter material comprise plasticized cellulose acetate tow.
4. (Original) The cigarette of Claim 1, wherein the overall length of the filter element is about 15 to about 65 mm.
5. (Original) The cigarette of Claim 4, wherein the overall length of the filter element is about 25 to about 50 mm.

6. (Original) The cigarette of Claim 1, wherein the length of each of the first and second sections of filter material is about 5 to about 25 mm.
7. (Original) The cigarette of Claim 6, wherein the length of each of the first and second sections of filter material is about 5 to about 15 mm.
8. (Original) The cigarette of Claim 1, wherein the length of the adsorbent-containing region of said compartment is about 5 to about 20 mm.
9. (Original) The cigarette of Claim 8, wherein the length of the adsorbent-containing region of said compartment is about 5 to about 10 mm.
10. (Original) The cigarette of Claim 1, wherein the total length of said compartment is about 10 to about 50 mm.
11. (Original) The cigarette of Claim 10, wherein the total length of said compartment is about 10 to about 30 mm.
12. (Original) The cigarette of Claim 1, wherein the length of said semi-permeable barrier is about 1 to about 10 mm.
13. (Original) The cigarette of Claim 12, wherein the length of said semi-permeable barrier is about 1 to about 5 mm.
14. (Original) The cigarette of Claim 1, wherein said adsorbent is selected from the group consisting of activated carbon, molecular sieves, clays, activated aluminas, silica gels, and mixtures thereof.
15. (Original) The cigarette of Claim 1, wherein said adsorbent is activated carbon.

16. (Original) The cigarette of Claim 15, wherein the activated carbon has an activity of about 60 to about 150 Carbon Tetrachloride Activity.
17. (Original) The cigarette of Claim 1, wherein said adsorbent is in granular form.
18. (Original) The cigarette of Claim 17, wherein said adsorbent has a particle size of about 8x16 mesh to about 30x70 mesh.
19. (Original) The cigarette of Claim 1, wherein said semi-permeable barrier is selected from the group consisting of paper, cellulose acetate tow, gathered cellulose acetate web, polypropylene tow, gathered polypropylene web, and gathered polyester web.
20. (Previously Presented) A cigarette comprising a tobacco rod and a filter element connected to the tobacco rod, said filter element having an end proximal to the tobacco rod and an end distal from the tobacco rod, wherein said filter element comprises:
 - a first longitudinally extending section of fibrous tow filter material positioned at the end of the filter element proximal to the tobacco rod;
 - a second longitudinally extending section of fibrous tow filter material positioned at the end of the filter element distal from the tobacco rod and spaced apart from said first section of filter material, the two sections of filter material defining a compartment therebetween by enclosing each end of said compartment; and
 - a semi-permeable membrane comprising paper or a fibrous filter material dividing said compartment into a first hollow region adjacent to said first section of filter material and a second region containing a granular adsorbent material adjacent to said second section of filter material.

EVIDENCE APPENDIX

No additional evidence of patentability has been submitted to the Examiner.

RELATED PROCEEDINGS APPENDIX

There are no decisions by a court or the Board in related proceedings.